

patients with schizophrenia, patients s/p unilateral anterior temporal lobectomy, patients s/p surgical excision of focal frontal tumors, and healthy controls. Results reveal that initial acquisition functions correlate as expected with illness severity parameters, but after titration on initial accuracy levels, delay effects are similar across groups. These findings suggest that after controlling for basic perceptual and response classification processes, differential frontal and mesiotemporal lesion effects are difficult to discern. The results support the hypothesis that both patients with schizophrenia and those with focal frontal or mesiotemporal lesions may show deficits reflecting integrated frontolimbic system dyscontrol, and severity of impairment in basic classification operations may mark this dysfunction.

### SHAPE PERCEPTION IN SCHIZOPHRENIA: EEG ANALYSIS OF A CORTICAL ACTIVATION TASK

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Altered lateralization of brain function is currently under intensive discussion as a possible factor in the pathogenesis of schizophrenia. Numerous studies have demonstrated lateralized EEG patterns under activation. Right parietal cortical regions are well known to be pivotal for shape perception in normals.

We developed a shape perception task in which slowly changing elementary geometric forms (circle, triangle, rhombus) were displayed on a computer screen. Subjects were asked to press a reaction button when changing shapes were perceived as symmetric. Topographic cEEG and reaction times were measured during the task.

15 unmedicated sub-chronic (total duration of illness less than 2 years) patients with schizophrenia (ICD-10 F20.0, F20.3) were compared to 15 matched normal controls. Patients with major depression (ICD-10 F31.4, F32.2) were recruited as an additional control group.

EEG Analysis showed distinct patterns of lateralization in the examined groups. Implications are discussed in view of the ongoing debate on the pathogenesis of schizophrenia.

### TOWARDS AN UNDERSTANDING OF THE COGNITIVE BASIS OF DELUSION FORMATION IN SCHIZOPHRENIA USING VISUAL SCAN PATHS

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Cognitive explanations for delusion formation have emphasised the role of distorted appreciation of complex stimuli. The study investigated information processing in deluded subjects (DS) using a novel, physiological marker of visual attention, the visual scan path — a map tracing the direction and duration of gaze when an individual views a stimulus. The aim was to demonstrate the presence of a specific deficit in processing meaningful stimuli (eg. human faces) in DS by relating this to abnormal viewing strategies. Visual scan paths were measured in DS ( $n = 7$ ), non-deluded schizophrenics ( $n = 7$ ) ( $\geq 3$  and  $< 3$  on SAPS, respectively) and age-matched normal controls ( $n = 10$ ). Neuroleptic medication, SANS score and illness duration did not differ significantly between patient groups. The eye-tracking unit employed a pupil-diameter determination technique via infrared illumination. A fixation was defined as consecutive gaze positions within one degree for 200 milliseconds or more. DS employed abnormal strategies for viewing single faces and face pairs in a recognition task, staring at fewer points and fixating non-feature areas to a significantly greater extent than control groups ( $p < 0.05$ ). Testing on a second occasion with DS demonstrating improvement in delusion ratings revealed a less-marked difference in viewing strategies across all three groups. The results indicate the presence of abnormal infor-

mation processing in DS: reliance on less-salient visual information for decision-making in the recognition task, which diminishes with resolution of delusions. This suggests a state-dependent processing abnormality in DS, and can be linked with theories of abnormal reasoning underlying delusion formation.

### THE HISTORICAL BACKGROUND AND COGNITIVE NEUROSCIENCE OF PERCEPTUAL PROCESSES IN PSYCHOSIS

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In the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV), hallucinations are defined as "a sensory perception that has the compelling sense of reality of a true perception but that occurs without external stimulation to the relevant sensory organ." (p. 767).

This definition dates back to Karl Jaspers, who not only established the clear-cut distinction between perception and imagery, presumably on "phenomenological" grounds, but also likened hallucinations to perception. This view has remained standard in clinical psychiatry up to the present although it was questioned whenever hallucinations were scrutinized in detail. In fact, the concept was explicitly stated to be of little use for clinical work (cf. Schröder 1915) as well as in research into the effects of hallucinogens (cf. Beringer 1927), sensory deprivation (cf. Shurley 1962, Vernon 1963), and electrical cortical stimulation (cf. Penfield & Perot 1963). Recent findings in the field of cognitive neuroscience, as summarized by Kosslyn (1994), further question the validity of the perception-imagery distinction and any concept based on it.

It is concluded that the history of the concept as well as recent findings from research into visual and imagery processes justify a conceptual change. Hallucinations should not be defined as "true sensory perceptions", but rather as experiences that are more or less perception-like. It is argued that although this definition appears to be less precise than the current definition, it in fact leaves more room for clinical description and does not force the clinician to making an arbitrary distinction.

### VISUAL SCANNING STRATEGIES AND COGNITIVE DYSFUNCTIONS IN A VISUOMOTOR TRACKING TASK IN THE COURSE OF SCHIZOPHRENIA

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In the search for neurobiological determinants of cognitive dysfunctions in schizophrenics, objective and differentiated behavioral indicators of these dysfunctions are needed. In normals the analysis of visual scan path has proved to be a useful tool to study cognitive processes for years. Appropriate task conditions presupposed, scan path analysis may also help in a differentiation of cognitive dysfunctions in schizophrenia. Using eye movement recordings during the performance of the trail-making test (TMT) we have recently shown that acute schizophrenics have difficulties in parallel processing of visuomotor search and manomotor tracking, resulting in poorer TMT performance. Since these — timestable — dysfunctions occurred especially under test conditions requiring the subjects to alternate between two response categories (TMT-B) but not under conditions using only one response category (TMT-A), the present study should clarify the contribution of (1) pure manomotor tracking abilities and of (2) the ability to shift response categories to the TMT performance deficit. Therefore, the original TMT-A/B and experimental variations of the task (1) without the necessity of concurrent visuomotor